

FIG. 1

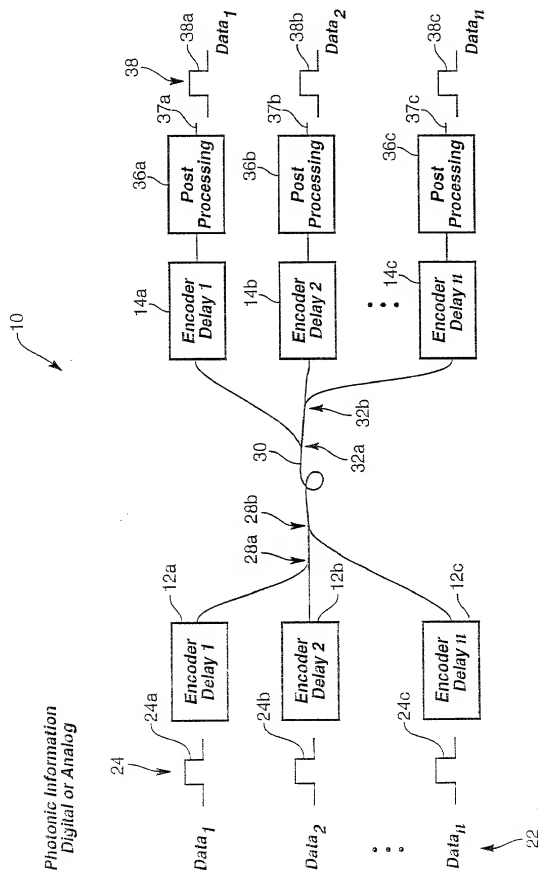
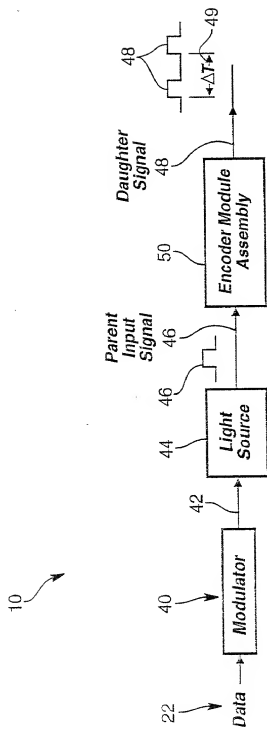
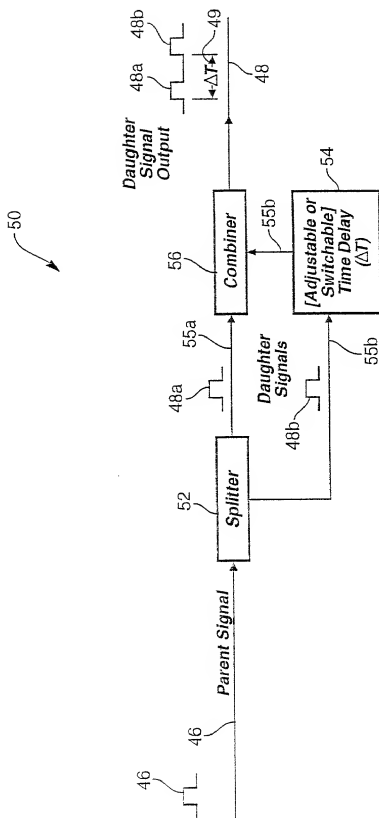


Fig. 2



Differential Delay Multiplexer Sender/Encoder

Fig. 3



Differential Delay Multiplexer (DDM) Sender/Encoder

*Fig. 4*

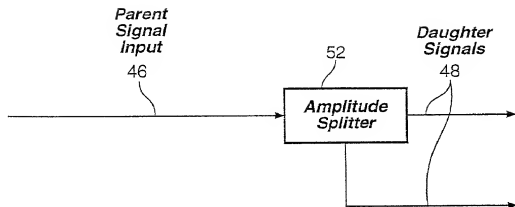
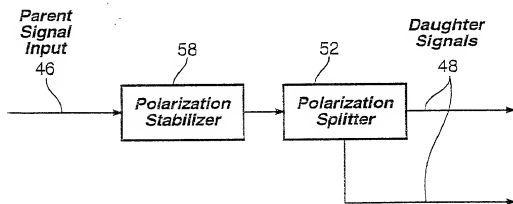
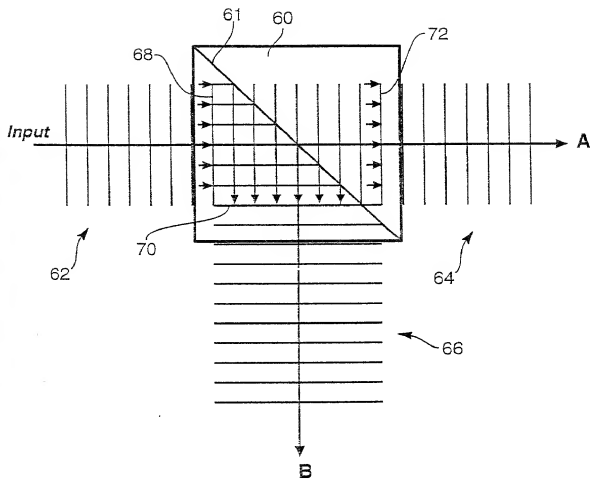


FIG. 5



Splitting Criteria

FIG. 6



Amplitude or Polarization Splitter

**FIG. 7**

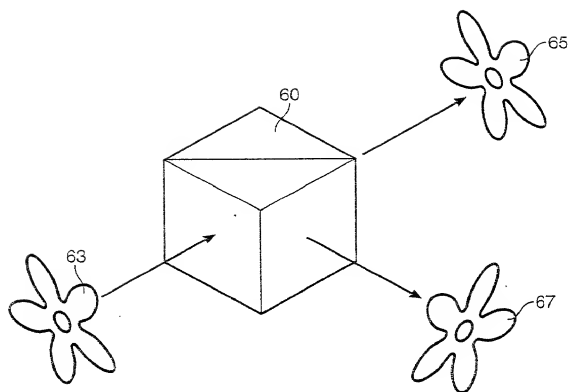
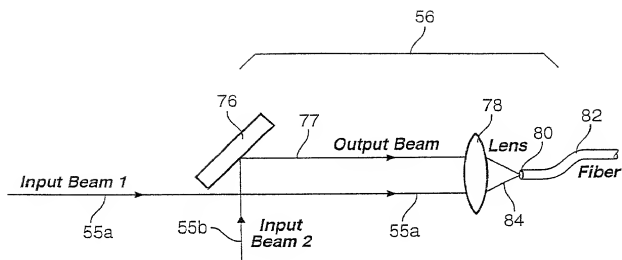


Image Signals Which  
Maintain Spatial Information

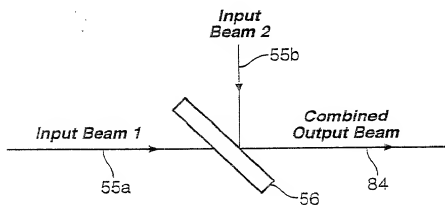
**FIG. 7A**

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Beam Combiner

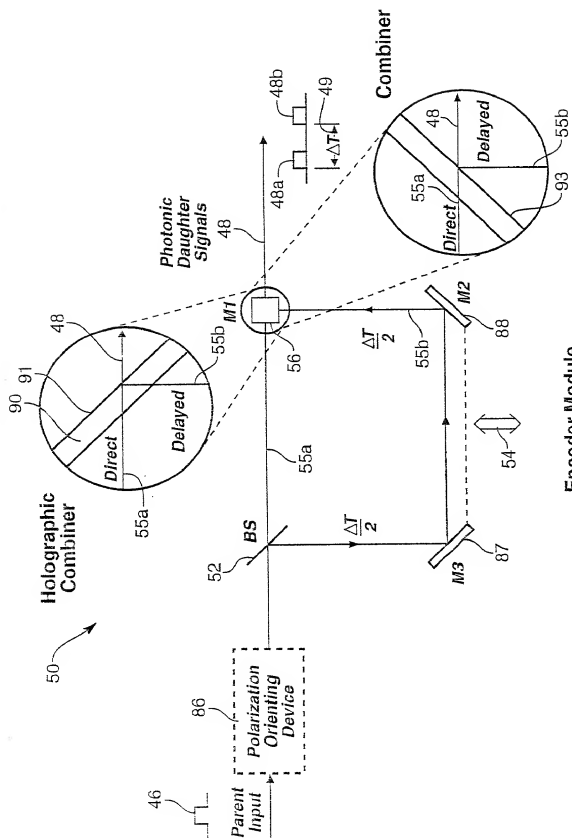
FIG. 8



Amplitude or Polarization Combiner

FIG. 9

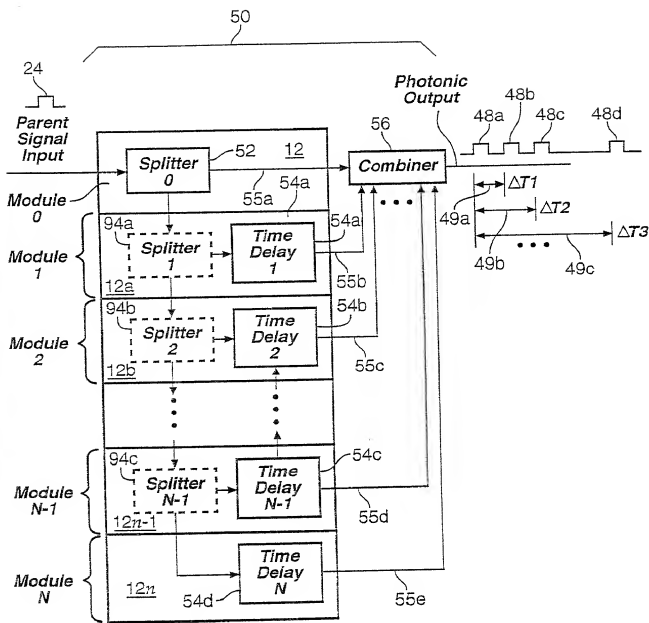




Encoder Module

Fig. 10

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Composite Encoder  
Module Assembly

FIG. 11

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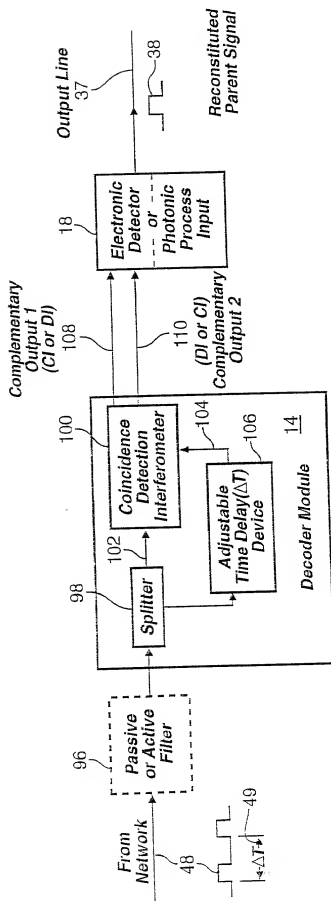


Fig. 12

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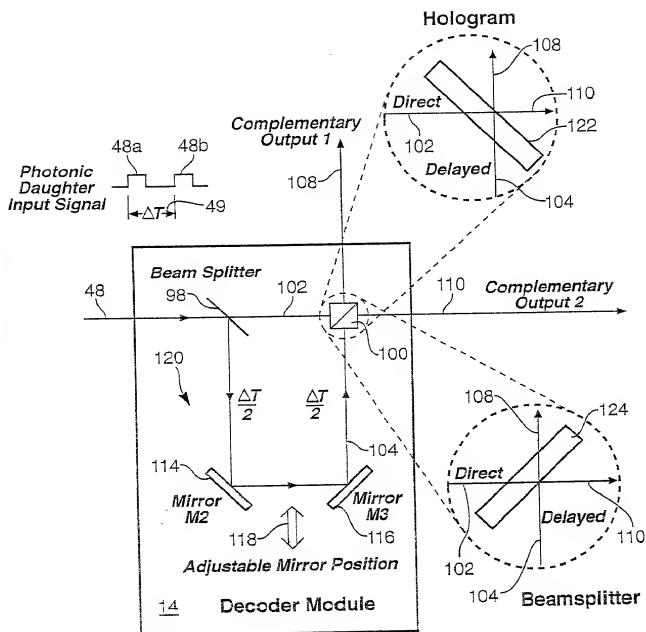


FIG. 13

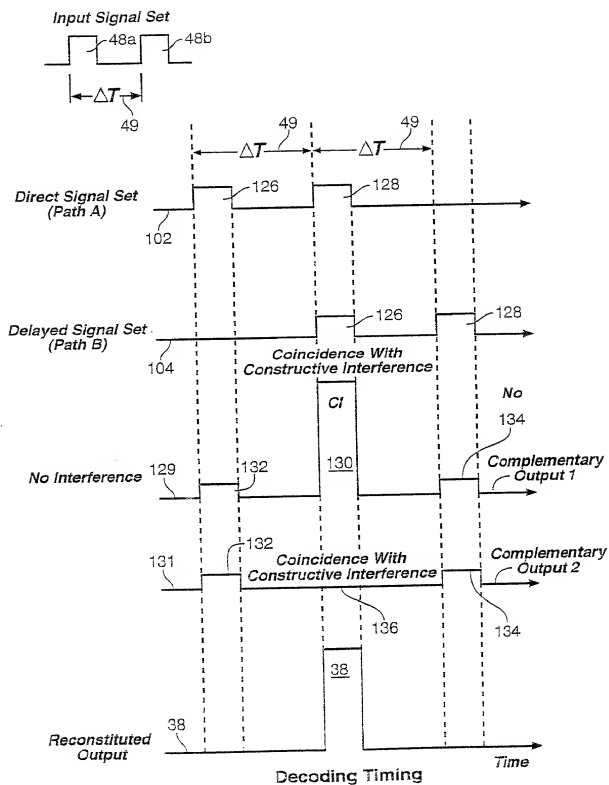


FIG. 14

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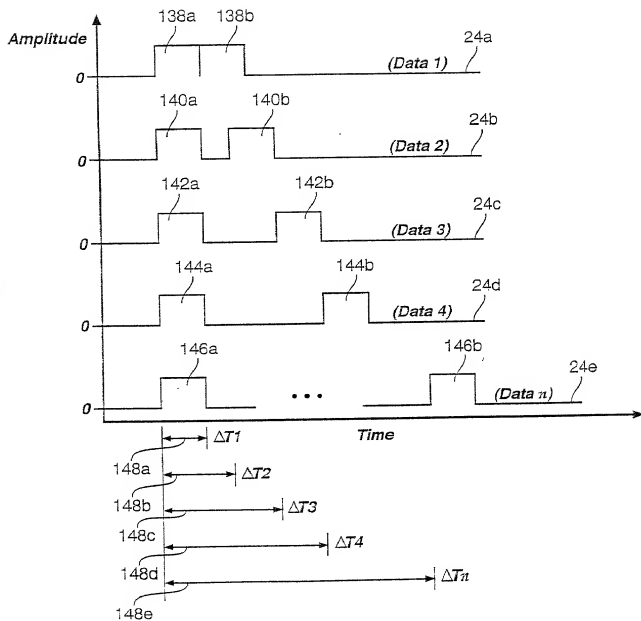


Fig. 15

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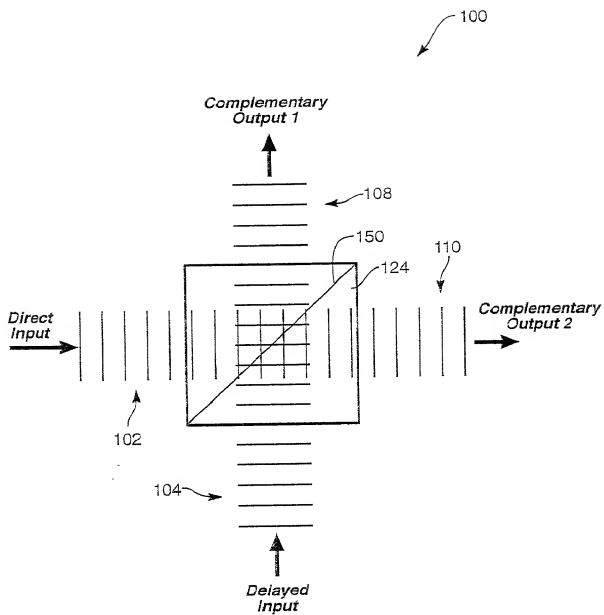


Fig. 16

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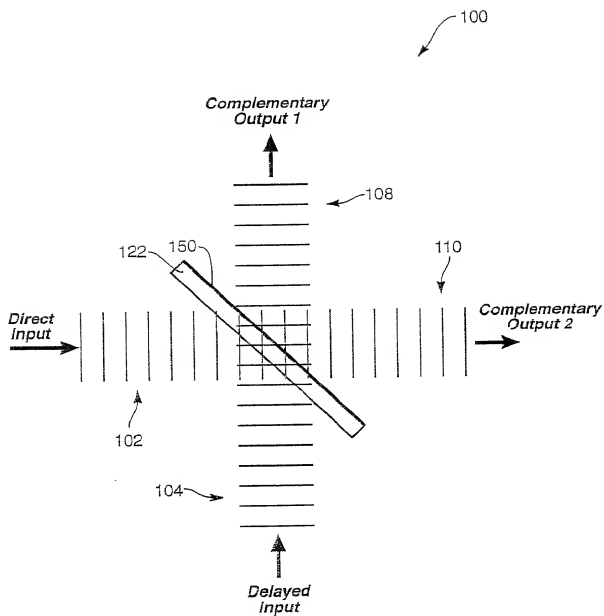


Fig. 17



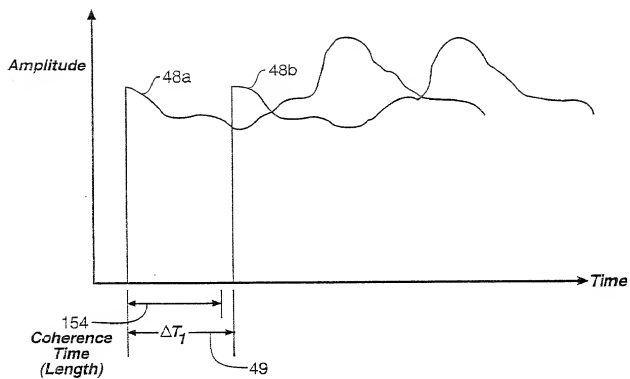


Fig. 18

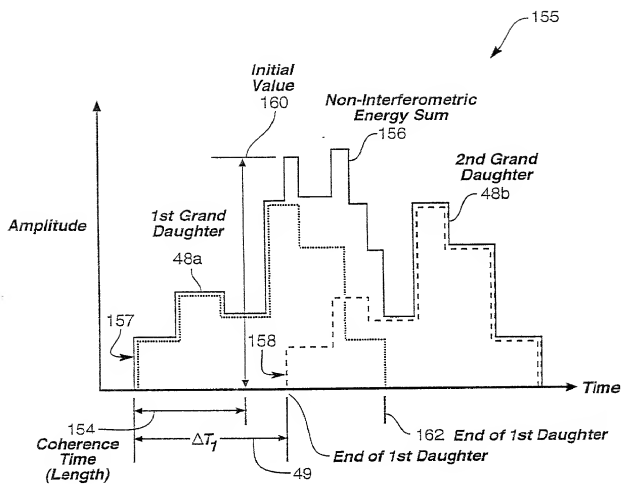


Fig. 19

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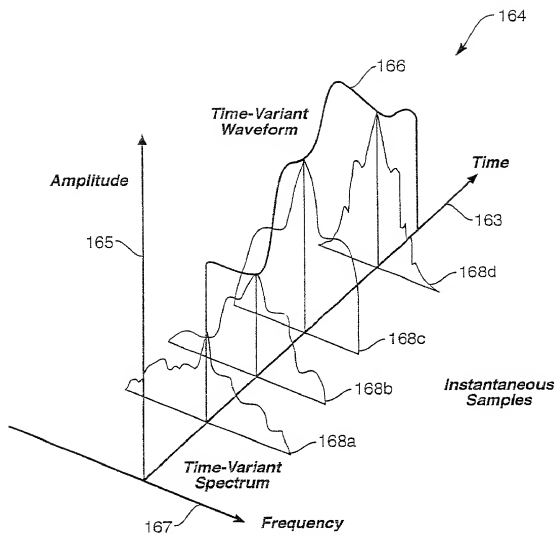


Fig. 20

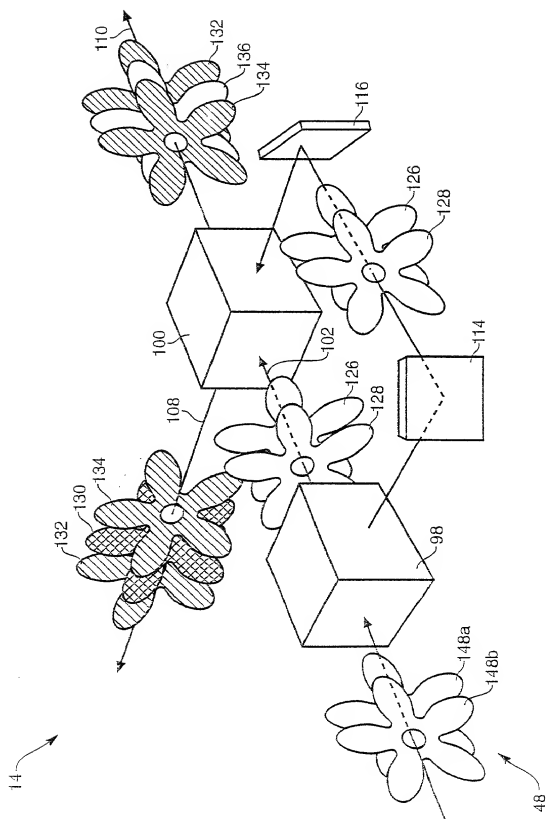
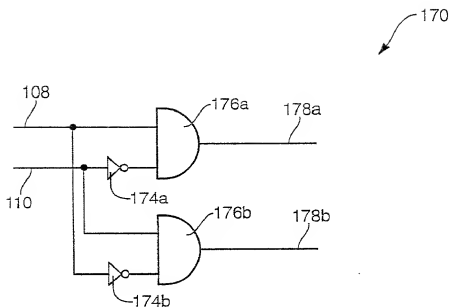


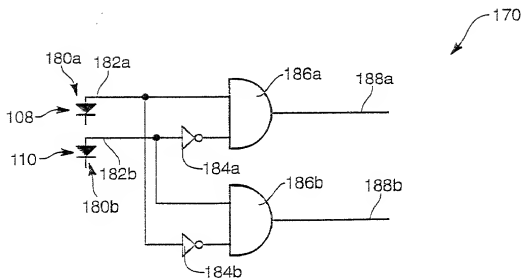
Fig. 21

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Photonic Processor

**Fig. 22**



Electronic Processor

**Fig. 23A**



**Fig. 23B**

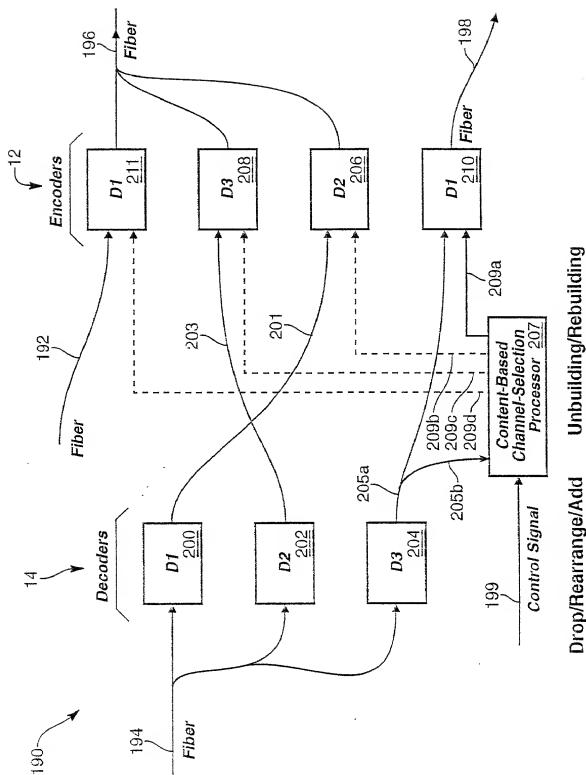
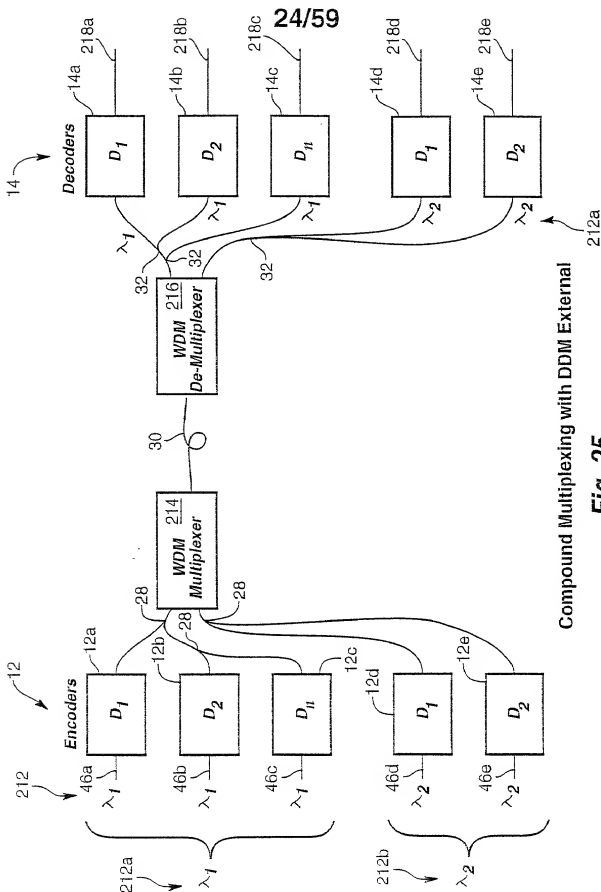


Fig. 24

Drop/Rearrange/Add      Unbuilding/Rebuilding



Compound Multiplexing with DDM External

Fig. 25



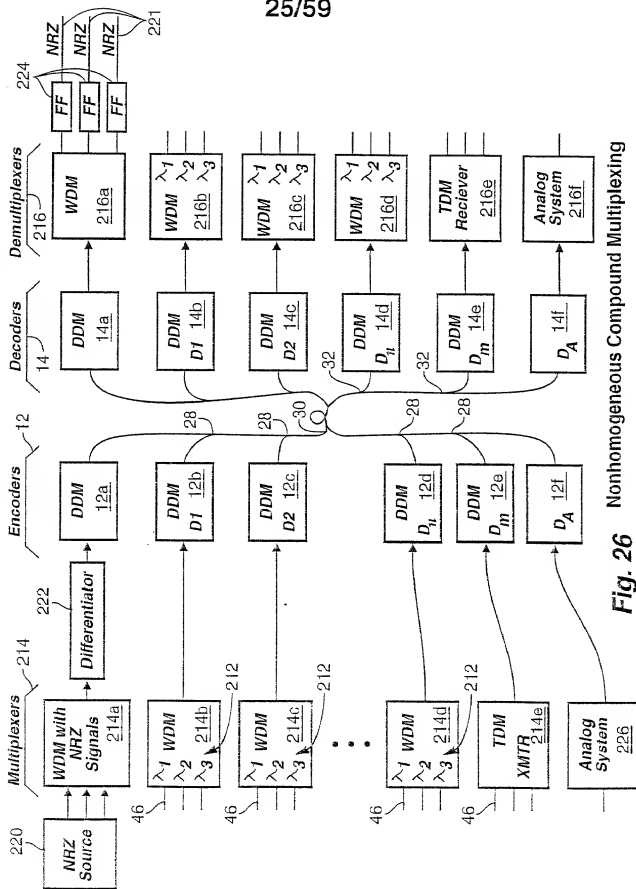
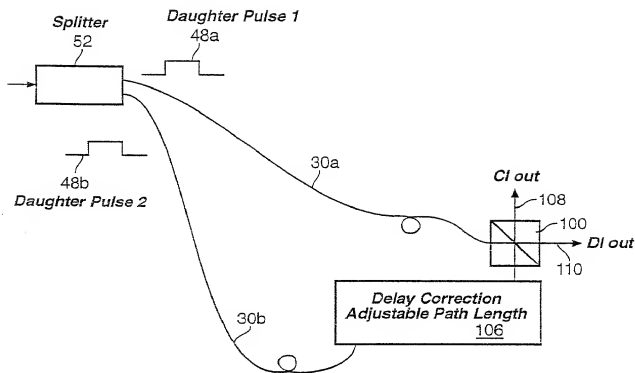


Fig. 26 Nonhomogeneous Compound Multiplexing



**Multiple Delay Path**  
**Integrated Delay and**  
**Delay Correction**

**FIG. 27**

## Photonic NRZ Interface

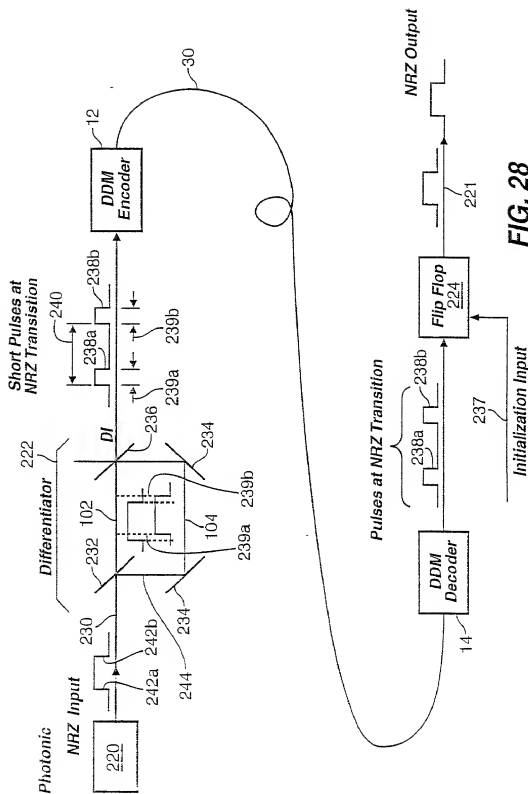


FIG. 28

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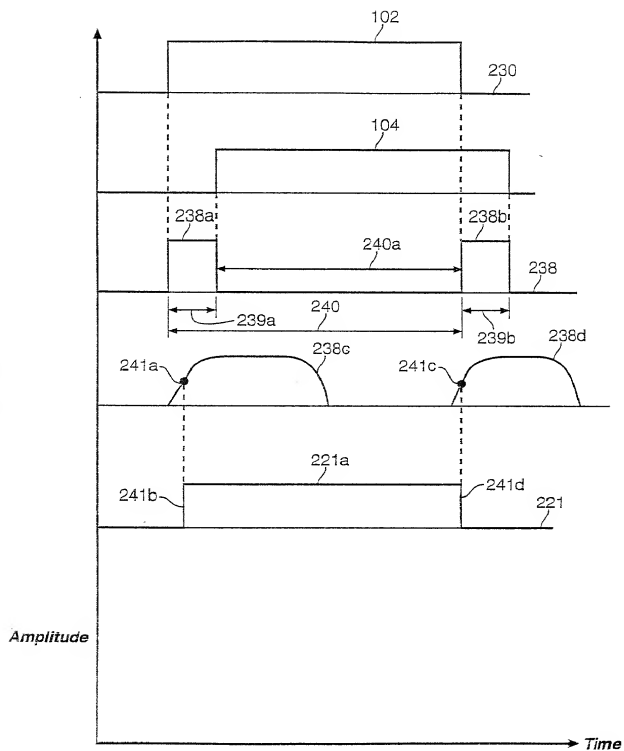
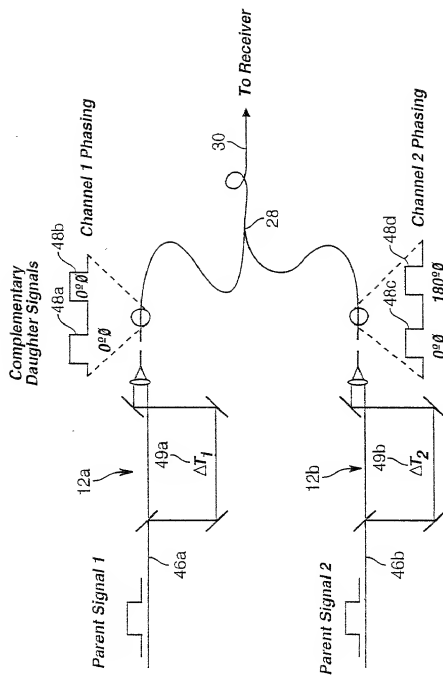


FIG. 29



Phase Sequenced Dual Channel Encoder

**FIG. 30**

# Phase Sequenced Dual Channel Decoder

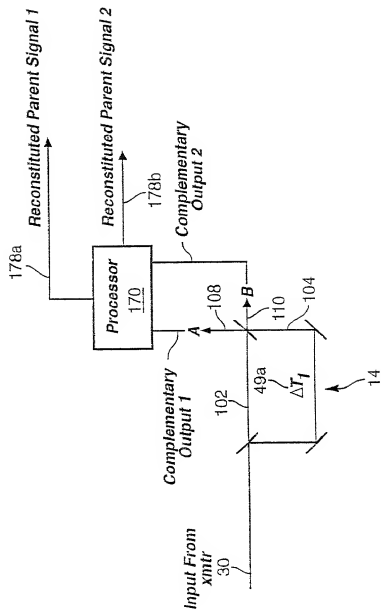


FIG. 31

## Phase Sequence Timing

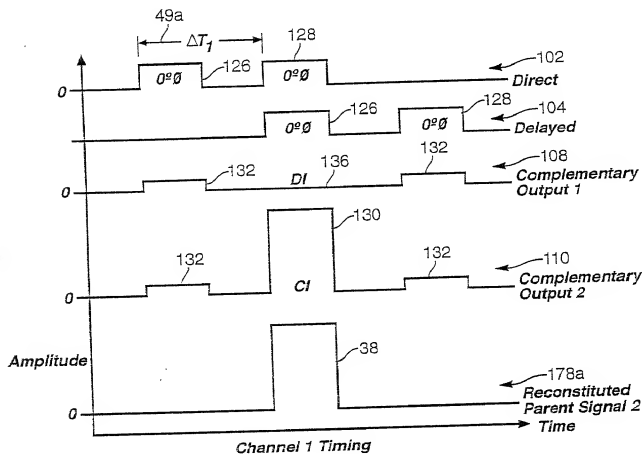


FIG. 32

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# Phase Sequence Timing

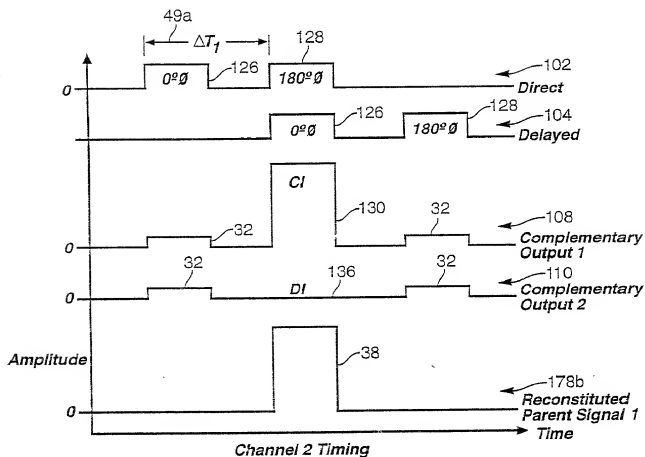


FIG. 33



# Quadrature Encoding/Decoding Apparatus

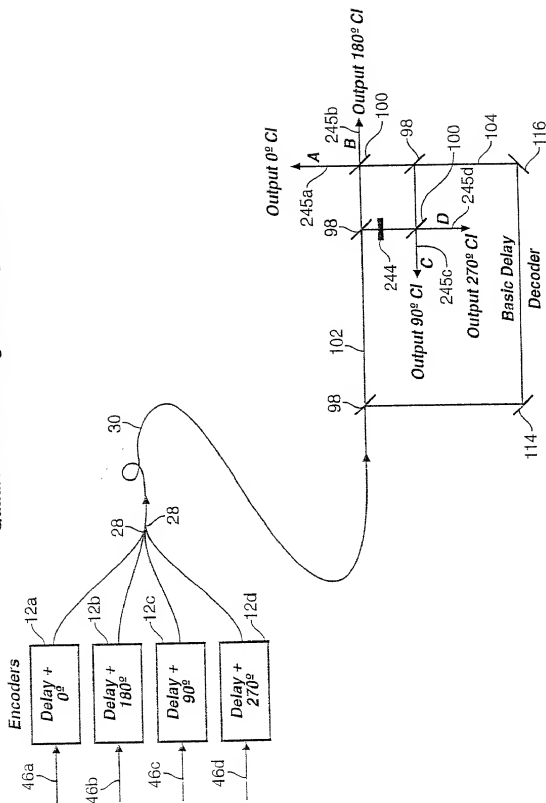


FIG. 34

	<i>Phase of Direct Signal</i>	<i>Phase of Delayed Signal</i>	<i>Quadrature Outputs</i>			
			<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
46a → <i>Channel 1</i>	0	0	<i>CI</i>	<i>DI</i>	<i>C = D</i>	
46b → <i>Channel 2</i>	0	180	<i>DI</i>	<i>CI</i>	<i>C = D</i>	
46c → <i>Channel 3</i>	0	90	<i>A = B</i>		<i>CI</i>	<i>DI</i>
46d → <i>Channel 4</i>	0	270	<i>A = B</i>		<i>DI</i>	<i>CI</i>

245a 245b 245c 245d

FIG. 35

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# Quadrature Wave Forms For One Channel

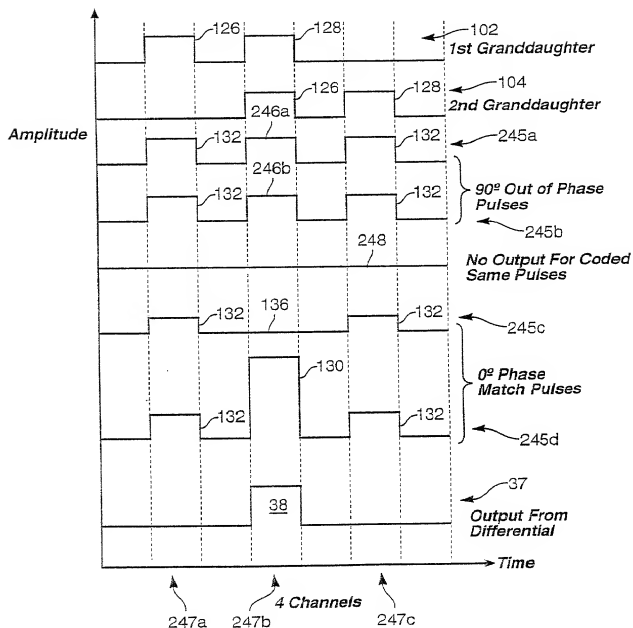


FIG. 36

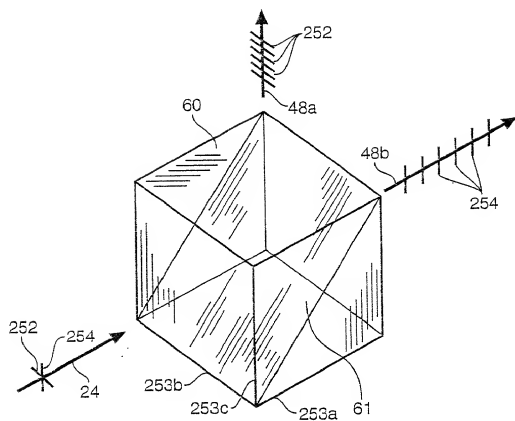


FIG. 37A

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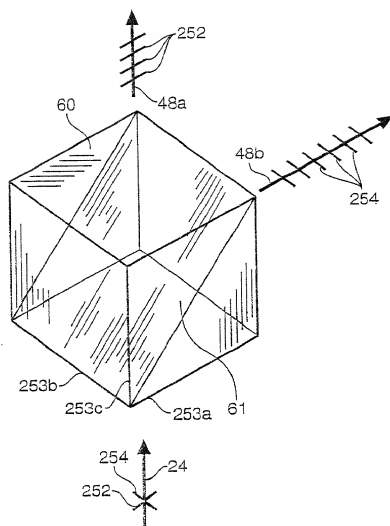
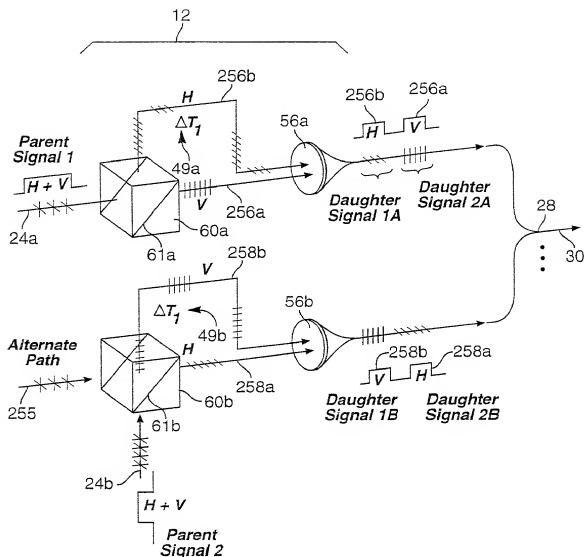
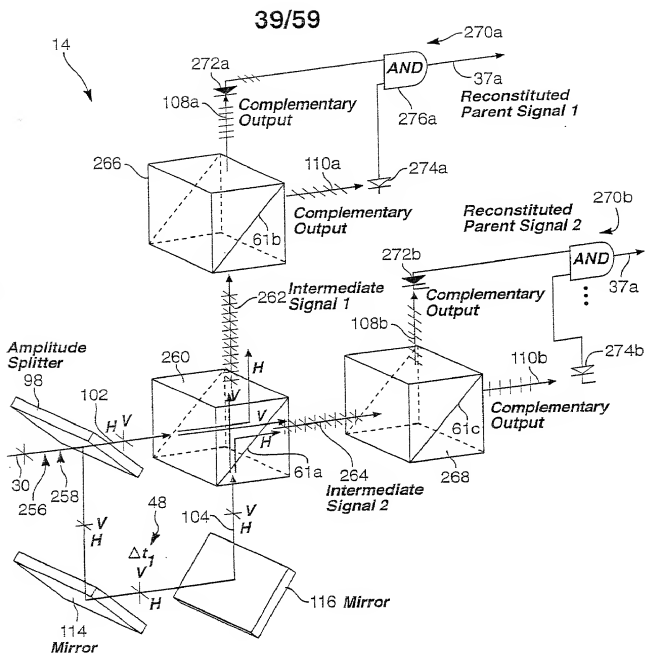


FIG. 37B



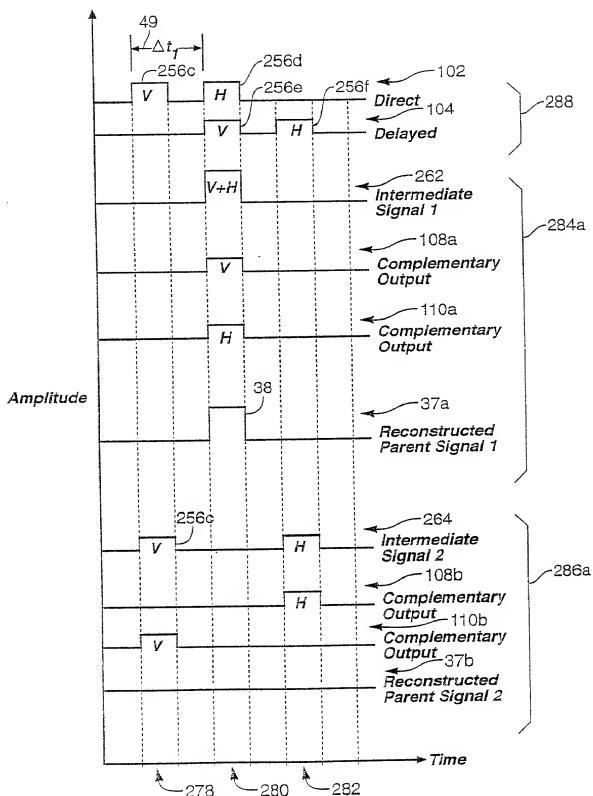
Double Encoder With Polarizations Sequenced to Differentiate 2 Channels Having the Same Time Delay Between Daughter Signals

FIG. 38



**Double Decoder With Polarizations Sequenced to Differentiate 2 Channels Having the Same Time Delay Between Daughter Signals**

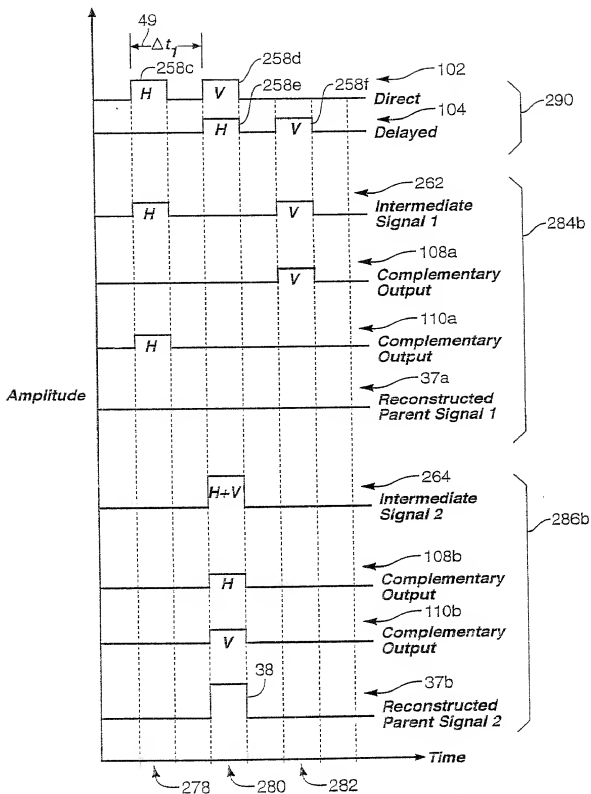
**FIG. 39**



Polarization Sequenced Channel 1 Timing

FIG. 40





Polarization Sequenced Channel 1 Timing

FIG. 41

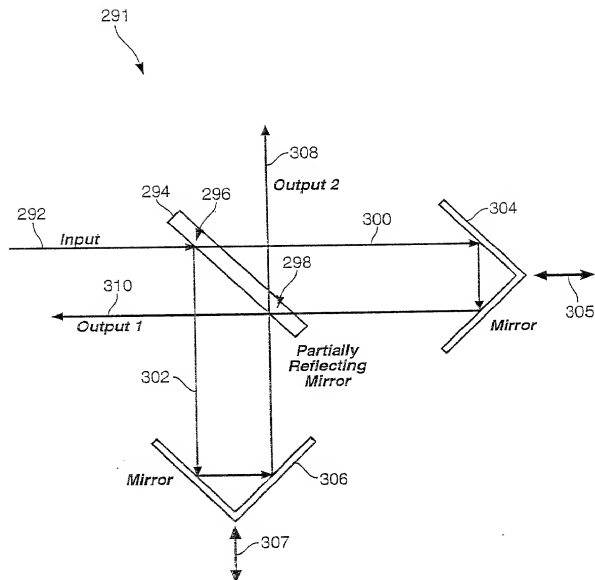


FIG. 42

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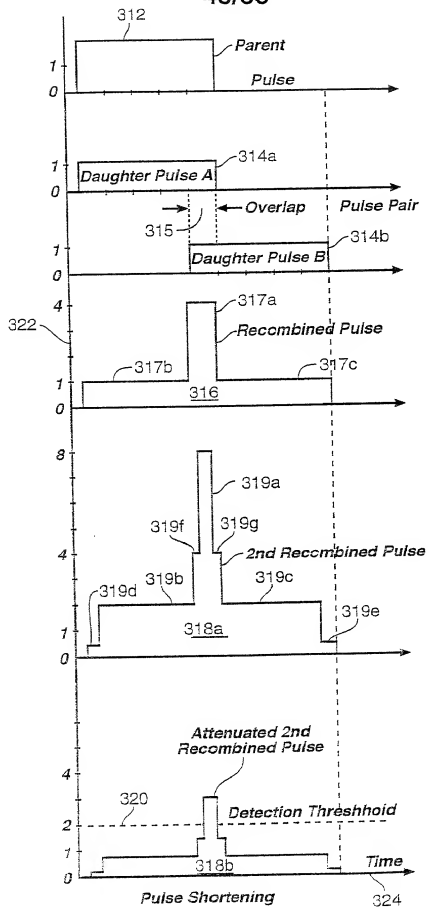
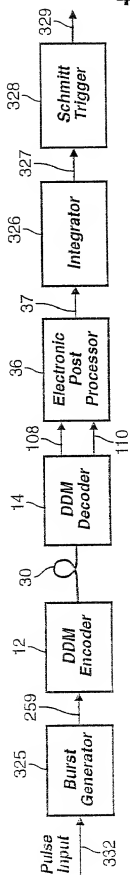


FIG. 43



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FIG. 44

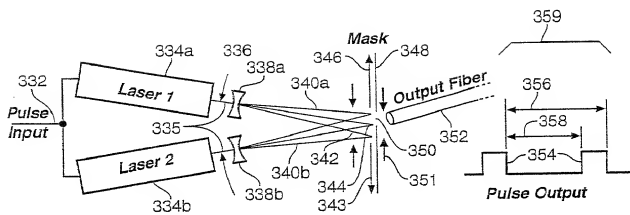


FIG. 45

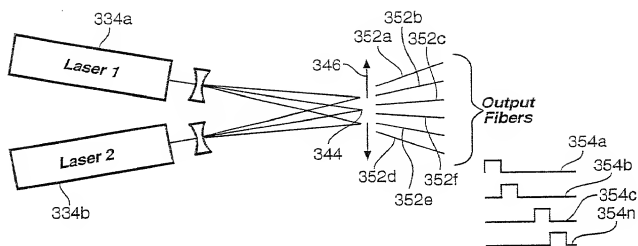


FIG. 46

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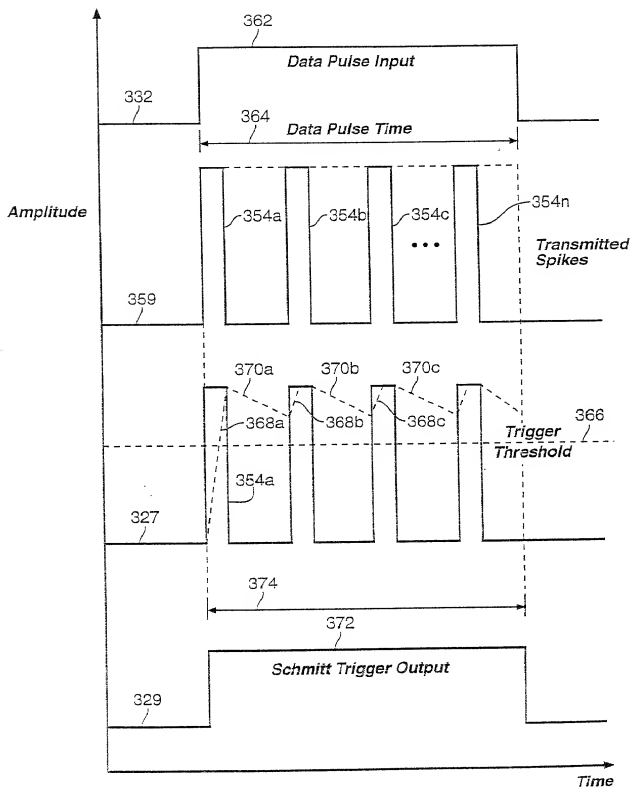


FIG. 47

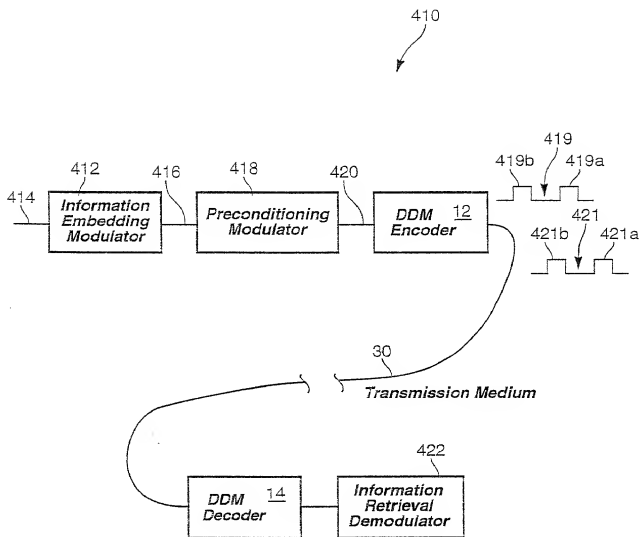


FIG. 48



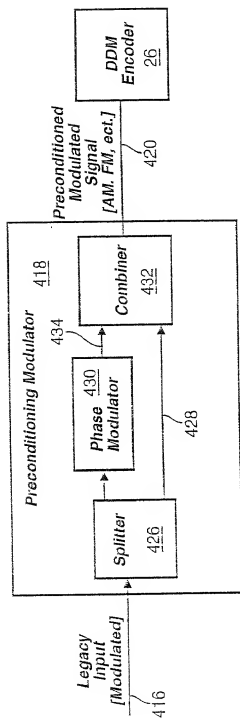


FIG. 49

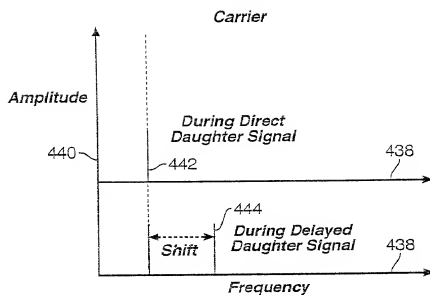


FIG. 50

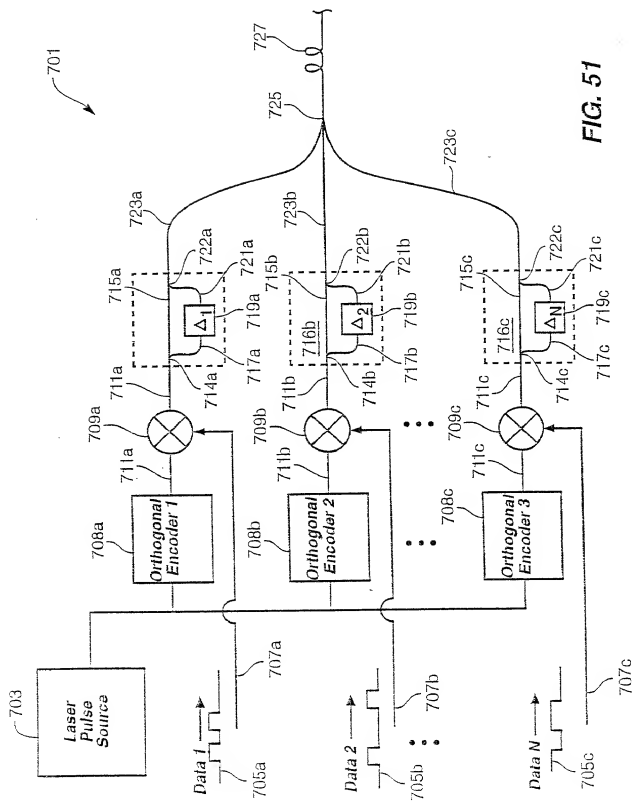


FIG. 51

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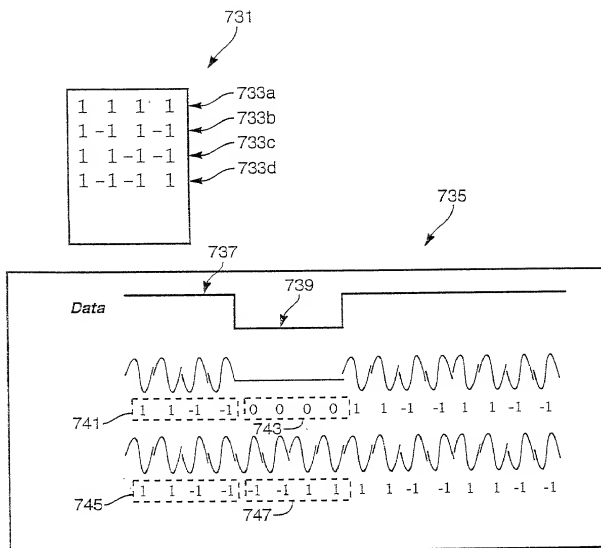


FIG. 52

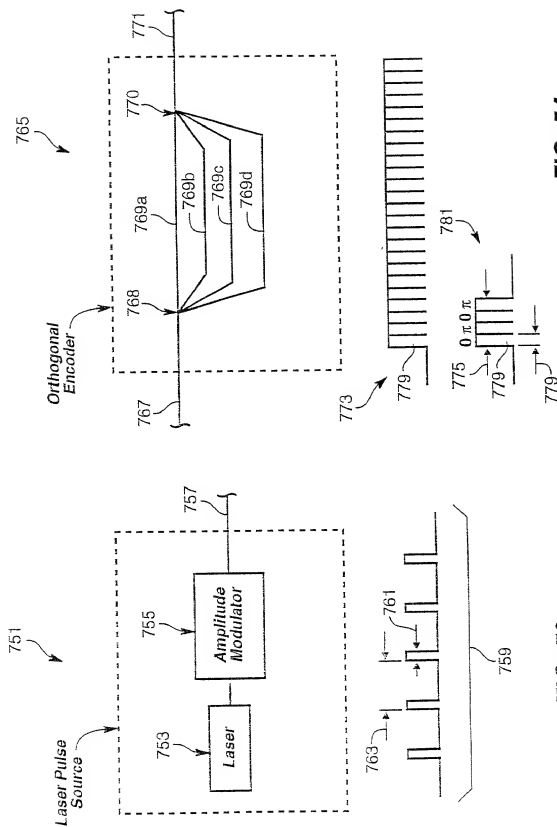
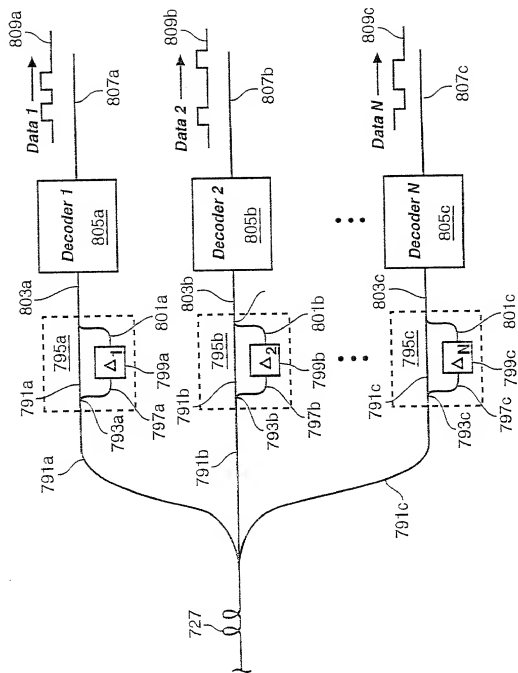


FIG. 54

FIG. 53



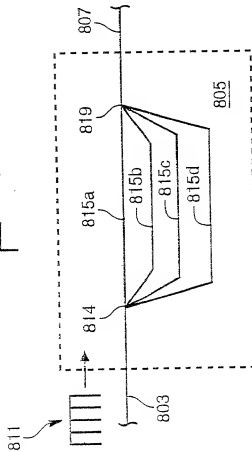
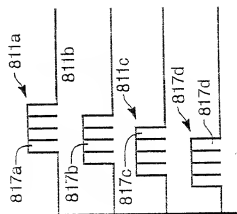


FIG. 56

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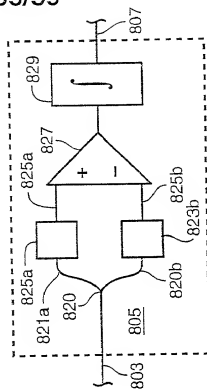


FIG. 57

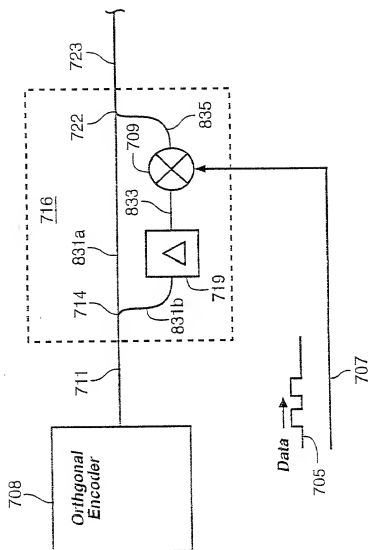


FIG. 58



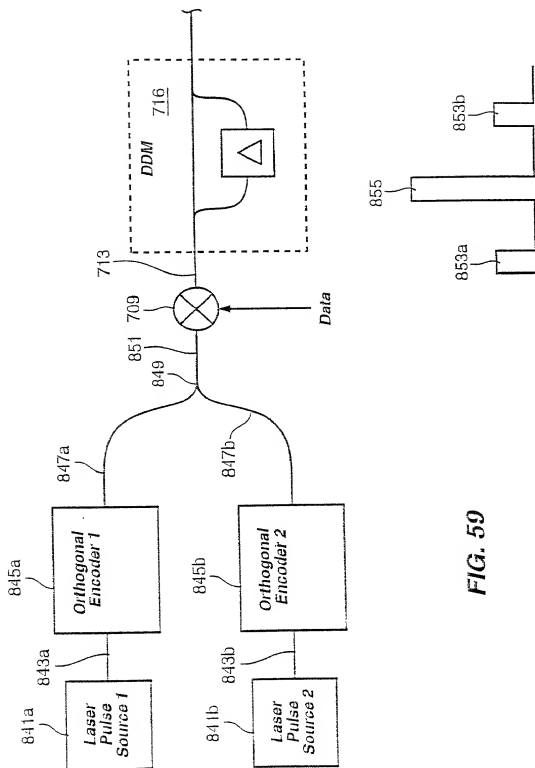


FIG. 59

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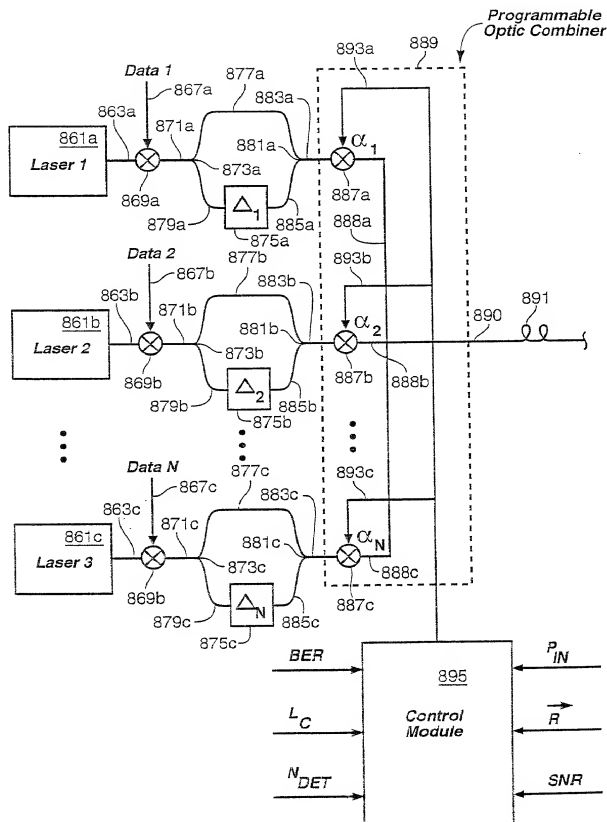


FIG. 60

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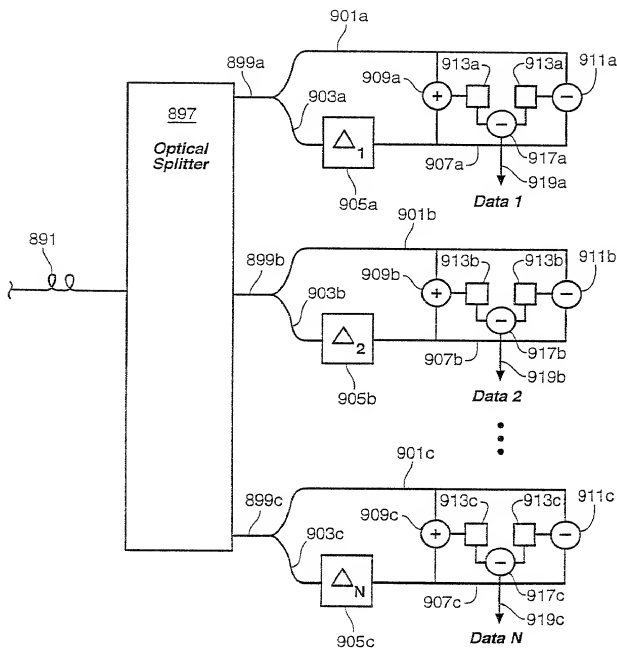


FIG. 61